



CLIMATE WATCH

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O'LEARY AFFIRMS EMISSIONS REDUCTION POLICY

Testifying before the Senate Energy Committee on June 29, Energy Secretary Hazel O'Leary reaffirmed President Clinton's Earth Day commitment to reduce greenhouse gases to 1990 levels by the year 2000.

O'Leary said that projections for population growth and energy use suggest that pollution will rise and that it "would be irresponsible" not to curb it. Not only must the United States cap emissions, she said, but it must cut them as well.

According to forecasts, the United States is on the way to emitting 1.87 billion tons of carbon dioxide and nitrous oxides annually. If these projections are

accurate, the administration will have to seek a 12 percent reduction in emissions by the year 2000.

O'Leary conceded that the failure of the energy tax to pass the Senate has hampered progress toward this goal, but she added that the tax was not the sole part of the effort. Other options being explored include voluntary energy-efficiency undertakings, weatherization aid, promotion of alternative fuel vehicles, federal energy cuts, and more use of both natural gas and renewable resources such as solar, wind and geothermal energy. ●

HOUSE COMMITTEE APPROVES "GREEN" TECHNOLOGIES LEGISLATION

The House Merchant Marine Committee approved legislation on June 7 aimed at developing a marketing strategy for "green" technologies—goods and services that prevent or clean up air, water or land pollution.

Representative Gerry Studds (D-Mass.) introduced the legislation (HR 2112) on May 12. The measure would establish a joint public-private council to develop a national plan to create manufacturing jobs in the growing U.S. environmental technology industry and to increase environmental exports. The council also would authorize funds for six regional centers to assist business, establish an environmental service corps within the Peace Corps, and establish overseas centers with commercial, legal and technical information for U.S. businesses hoping to tap foreign environmental technology markets.

In introducing the measure, Studds asserted that a concerted and coherent effort is crucial to expanding the United States' presence in a global market expected to grow to \$500 billion by the year 2000. Today, Studds continued, the United States is leading the world in developing environmental technologies but lagging behind in marketing these goods and services.

The only way to reverse this trend is to enlist the private sector, Studds told the House, "For it is the private sector that has developed these technologies, it is the private sector that will market these technologies in the global market and...will create the jobs we so badly need in this country."

Headed by the secretary of commerce, the council would include the secretary of energy, the administrators of both the Environmental Protection Agency and the Agency for International Development,

EC REJECTS ENERGY TAX

On June 7, European Community finance ministers rejected the proposed EC energy tax.

This decision jeopardizes the commitment the EC made at last year's Earth Summit in Rio to reduce carbon dioxide emissions to 1990 levels by the year 2000. In March, Germany, Italy, Denmark and the Benelux countries (Belgium, Holland and Luxembourg) threatened to reconsider ratification of the Rio Framework Convention on Climate Change if the EC-wide tax did not become law. Convinced that the tax is critical to the success of an EC-wide emissions strategy, these countries based their national emissions reduction programs on the proposed levy.

The vote came after months of debate over what types of energy should be taxed and how member nations should share the burden. France argued for a solely carbon-based tax. The United Kingdom opposed compensating for the higher emissions of poorer member states, which would require doing more than returning its own emissions to 1990 levels by the year 2000.

Even within countries supporting the tax there were doubts. BASF, the German chemical giant, projected that a carbon tax would cost one-third of the country's 600,000 jobs in the chemical industry, exacerbating current political and economic troubles. ●

and the presidents of both the U.S. Export-Import Bank and the Overseas Private Investment Corporation. In addition, the council would include 12 individuals from various groups, including the environmental technology and marine biotechnology industries as well as labor, consumer and environmental organizations. ●

Executive Director's Column

TECHNOLOGY COOPERATION IN THE DEVELOPING COUNTRIES

By John Shlaes

For more than two decades, U.S. industry has been a world leader in forming environmental policy as well as in developing and marketing technology. We can extend this knowledge and expertise worldwide as the groundwork is laid to implement the United Nations Framework Convention on Climate Change and to assist developing countries in expanding their economies and energy use, while holding down increases in greenhouse gas emissions. Technology, not constraint, is the key to the future, and U.S. business has the opportunity to provide that key.

During the last three years, the GCC Technology Committee has spearheaded an active program to address national and international issues and to assist U.S. government activities related to technology cooperation. The coalition has participated in numerous policy meetings with representatives of Congress and federal agencies, such as the Council on Environmental Quality, the Agency for International Development, the Environmental Protection Agency, and the Departments of Commerce, Energy and State. Additionally, the coalition has addressed technology cooperation issues before the U.N.'s Intergovernmental Negotiating Committee (INC), has co-chaired a conference with the Department of Commerce on technology transfer to Eastern Europe, and has worked on proposals for a business-initiated Technology Cooperation Corps. Currently, the GCC is preparing a resource guide for business on technology cooperation programs of the U.S. government, which will be available soon.

In 1991, at the INC's first meeting, the GCC highlighted the important role of U.S. technology.

"Business and industry will be especially involved through our continuing work in research, development, commercialization and transfer of efficient, environmentally sound technologies to

address these issues over the coming decades."

Later, at the 1992 Rio Summit, provisions of the Framework Convention emphasized the importance of technology.

"The developed countries...shall take all practicable steps to promote, facilitate, and finance, as appropriate, the transfer or access to environmentally sound technologies and know-how to other parties, particularly developing country parties...."

The Problem

The United States has among the lowest rates of greenhouse gas emissions per unit of GNP in the world. Greenhouse gas emissions in developed nations, as a whole, are also very low for the value of goods and services produced. Developing countries and the former centrally planned economies emit a far greater volume of greenhouse gases for each unit of their GNP than the United States. Today, four-fifths of the world's people live in developing countries. It's in these countries that most of the population, economic and energy-demand growth — and resulting greenhouse gas emissions — are projected to occur.

The disparity in emissions per unit of GNP will persist, and in all likelihood, increase. Developing countries' use of fossil fuels is projected to increase dramatically by 2025, as more energy is required to support economic growth. The 1992 supplemental report of the Intergovernmental Panel on Climate Change indicated that 68 percent of total energy-related CO₂ emissions will come from non-OECD countries by 2025.

Given the current level of efficiency in the United States and the developed world, the marginal cost of reducing greenhouse gas emissions by increasing energy efficiency is far less in develop-

ing countries than in the developed world. For this reason, the developing countries' role in the process should be heavily emphasized. Special consideration should be given to ways to help developing countries upgrade their environmental policies, industrial performance and resource management practices.

Technology transfer is principally a private sector-to-private sector, rather than a government-to-government, activity. The worldwide movement away from centrally planned economies toward private markets further underscores this fact. U.S. industry already has extensive environmental technology programs overseas. Many coalition member companies have joint ventures or other mechanisms through which they engage in technology cooperation with other countries. However, there is a role for governments in helping to foster the use of improved technology in developed countries.

The GCC and others have proposed a Technology Cooperation Corps as a mechanism to promote industry-led technology cooperation efforts. This would initially consist of sending industry managers overseas to specifically focus on environment and energy issues. Efforts would be greatly assisted by better access to government information on opportunities for technology transfer, business and government technology assistance programs, as well as by a coordinated effort to provide appropriate market-based financing facilities for the transfer of such technology. United States-supported programs at AID, the Export-Import Bank, the World Bank and regional development banks should be reassessed to improve both the transfer of U.S. technology and the United States' competitive position in this arena. The EPA and the Departments of Commerce and Energy all have important resources and programs that could provide needed information to industry. The DOE program of Assisting Deployment of Energy Practices and Technologies (ADEPT) is a good example of technology cooperation. ADEPT will assist developing countries and countries with economies

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Technology Cooperation

Continued from page 2

in transition in their choice and application of new energy technologies. These programs should be better coordinated among the agencies, and private sector interaction should be increased.

Barriers to Technology Cooperation

Inadequate protection of intellectual property rights can create barriers to technology transfer. Without protection for patents, trademarks and copyrights, U.S. companies have a strong disincentive to pursue the costly work of technological and industrial innovation and to transferring that technology overseas.

The antitrust implications of private firm collaboration are another problem. Private firms frequently are reluctant to establish joint research and technology development programs with other firms. Yet, because of the prohibitive costs and highly speculative nature of technology development programs, private companies are hesitant to sustain the costs alone. Thus, rapid development and diffusion of technology may suffer. If the uncertainties related to antitrust enforcement were clarified, private companies

could form joint ventures, merge their resources, and develop and introduce new products more quickly.

If properly prepared, the National Action Plans that will be developed by those countries ratifying the Framework Convention can provide a wealth of information about the capabilities of countries to supply technology and the needs of the countries that wish to receive technology. The Global Climate Coalition has recommended that each plan contain a "Technology Assessment" component. This would draw together information needed to allow for the efficient design of cooperative efforts among the suppliers and the receivers of technology.

Technology-receiving countries must realize that they have the responsibility not only to identify their technology transfer opportunities but also to reveal and remove the domestic barriers to effective cooperation with technology suppliers.

Finally, it is important that technology cooperation be interpreted in the broadest sense, including not only "hard" technology (i.e., equipment) but also "soft" technology — techniques, practices and "know how." Due to the private sector's

enormous operational experience, soft technology could be its most crucial contribution.

Furthermore, it may be that the transfer of soft technology provides the best opportunity for early technology collaboration. For example, through the Technology Cooperation Corps, private industry experts could provide assistance on issues such as reducing methane leakage in natural gas systems, or improving the operating efficiency of fossil fuel power plants. Actions in these areas could have a significant impact on greenhouse gas emissions, at relatively low cost, without encountering significant impediments related to intellectual property rights, financing or other issues associated with hard technology transfer.

While countries continue to negotiate frameworks for enhancing international technology transfer procedures between developed and developing countries or "economies in transition," industry should strive to develop, in partnership with government, a few pilot programs — "laboratories" — for beginning to understand the mutual needs and requirements of these potentially growing relationships. ●

POLICY CONSIDERATIONS FOR EFFECTIVE TECHNOLOGY COOPERATION

Since the vast majority of future greenhouse gas emissions will come from developing countries, finding ways to reduce those emissions is important. One of the most cost-effective ways to achieve these reductions is through the introduction of cleaner, more energy-efficient U.S. technologies. The Global Climate Coalition has identified several areas of concern that must be addressed if technology cooperation efforts are to succeed.

Points to Assess

- Conditions within a country that would be most conducive to improvement by more appropriate technology, in both the public and private sectors
- Specific technological requirements or technologies available for direct reduction of emissions, improvements in energy efficiency, enhancement of sinks, or other adaptation or mitigation requirements
- System support requirements and support available for education and training systems, management systems, maintenance and repair systems, and financing requirements

- Changes in existing technologies that may be required to meet a country's needs
- Barriers to technology transfer and remedial actions required to remove barriers
- Sources of technology and systems, including indigenous capability, technology import requirements and research capability to assess and adapt existing technologies to unique country requirements

To Enhance Program Success

- A prioritization of programs for technology applications, in both the public and private sectors
- A cataloguing of country export and acquisition programs, including purchases, joint ventures and foreign aid requirements
- A description of the support programs available in the receiving/supplying country
- Maintenance and monitoring programs planned and assistance made available ●

MANY GROUPS MONITOR RIO

June marked the first annual meeting of the 53-member U.N. Commission on Sustainable Development (CSD), the centerpiece of the United Nations effort to ensure implementation of the agreements at last year's Earth Summit, particularly Agenda 21—the action plan for promoting sustainable development.

Headed by Malaysia's Ambassador Razali Ismail, the CSD examined initial steps on financing technology transfer, and the extent to which the United Nations and other international organizations have acted on the Rio accords.

The CSD will rely on three outside agencies to accomplish its mission. The Department for Policy Coordination and Sustainable Development (DPCSD) will conduct the CSD's year-round bureaucratic work. The Inter-Agency Committee on Sustainable Development (IACSD) will assess the resource implications for the United Nations in implementing Agenda 21. And finally, a high-level advisory board of 15-25 eminent people from different regions and backgrounds, including scientists and representatives from industry, financial institutions and non-governmental organizations, will review key papers and advise the CSD.

Outside the United Nations, the Sustainable Development Task Force, created by the Rome-based Society for International Development (SID) to monitor progress toward implementing the Rio accords, will hold its first meeting in October. The task force will review three papers: "Technology cooperation and finance from the perspective of the enterprise sector," "Implications of Agenda 21 for governance and institutions," and "People's empowerment for sustainable livelihoods."

For more information on the CSD, contact the United Nations Public Affairs Office at 212/963-4475. ●

TECHNOLOGY TRANSFERS ON THE RISE WITHIN THE UNITED STATES

Energy Secretary Hazel O'Leary has indicated that Lawrence Livermore National Laboratory, one of the nation's top nuclear weapons design labs, might be used to repair environmental damage caused by work on nuclear weapons.

The proposal is in line with the Department of Energy's (DOE) new emphasis on technology transfer within the United States (see related story, page 5). The DOE recently approved two federal technology transfer agreements. The first, a project called the American Textile (AMTEX) Partnership, combines the research and development capabilities of both the U.S. textile industry and universities with the DOE laboratory system in hopes of boosting the competitiveness and environmental quality of the industry. AMTEX marks the first time the government has linked DOE lab resources with an entire industry, from raw materials to retail stores.

The second federal technology transfer project will allow Ogden Environmental and Energy Services Co. to test a uranium waste cleanup technology developed by

DOE's Oak Ridge National Laboratory in Tennessee. The method involves using microorganisms to remove uranium, arsenic and other heavy metals from waste streams.

In addition to these projects, the Clinton administration is formulating other technology transfer programs for the Environmental Protection Agency (EPA) and the Department of Defense (DOD).

At the EPA, for example, \$271 million in increased spending would go to cooperative efforts with industry to develop innovative technologies over the next four years, and \$36 million would fund new programs to market environmental technologies, including waste minimization techniques.

Another program holds changes for the DOD. The Defense Advanced Research Projects Agency (DARPA) would be reorganized and given more civilian assignments. In addition, the program would create a new high-level position, assistant secretary for economic and environmental security. Among the secretary's duties would be to increase the export of U.S. environmental technologies. ●

IEA's CO₂ MITIGATION FINDING

A recent issue of *Energy Daily* featured the work of the International Energy Agency's two-year-old Greenhouse Gas Research and Development Program. The program's seven-member group assesses "technologies used for abatement of greenhouse gases, specifically the CO₂ emitted from fossil fuel power generation."

The group has completed a series of studies on power generation and CO₂ capture technologies. Amine absorption, the CO₂ capture technology of choice, is an adaptation of methods currently used by the oil and gas industries.

Their studies indicate that, once captured, CO₂ is best transported as a supercritical fluid at pressures of 1,200 pounds per square inch and temperatures of 30-40 degrees Fahrenheit. This process is

now used commercially in the western United States to transport CO₂ from Wyoming and Colorado to Texas and New Mexico for enhanced oil recovery operations. This experience demonstrates that CO₂ can be captured, transported and disposed.

Capturing CO₂, however, requires massive amounts of energy and, as a result, is very costly.

The program's initial three-year funding arrangement for 2 million British pounds expires next year, and the group is negotiating with the program's 13 country participants for funding to carry it through 1997. The United States contributes about 12 percent of the budget through the Department of Energy's Fossil Energy Office. In the face of budget crises and easier domestic research alternatives, the program's future remains uncertain. ●

DOE ORGANIZES TECHNOLOGY TRANSFER WITHIN UNITED STATES

The Department of Energy (DOE) has unveiled a program to speed licensing of federally developed environmental technology in order to foster a partnership with the private sector as well as local governments in need of environmental remedies.

The program was developed by an ad hoc network of DOE staff members to complement the larger National Technology Initiative, a 10-agency effort to bolster public and private sector technology transfers within the United States.

In the March issue of *Environment Today*, Clyde Frank, a deputy assistant secretary in the DOE's environmental restoration division, describes the program's goal as "improving the tie between R&D and investment." The current system of Cooperative Research and Development Agreements (CRADAs) is, according to DOE officials, too cumbersome to accommodate the agency's burgeoning number of technologies; the agreements often impose legal restraints that preclude innovative licensing techniques.

Currently, the DOE program lacks the legislative remedies for which President Clinton and others have called. Although legislation may eventually be necessary, DOE officials say, for now the group will function as an ad hoc group.

Early efforts will be small scale, such as a waste site in need of cleanup, in order to test the agency's ability to negotiate streamlined commercialization contracts with private firms and financiers.

Future large-scale projects may include cleaning up a mine drainage site outside Butte, Montana, that contaminates about 7 million gallons of water with heavy metals each day. In addition to providing a clean water supply to the community, this project could yield as much as \$150 million in silver and copper. The hope, said Frank, is for the ad hoc group to function as a board of directors, ensuring that "everybody gets a return on their investment."

For more information, call DOE's Environmental Technology Information Service at 800/845-2096. ●

DOE's CARBON DIOXIDE INFORMATION CENTER

In 1982, the Department of Energy (DOE) established the Carbon Dioxide Information Analysis Center (CDIAC) at Tennessee's Oak Ridge National Laboratory to support its Global Climate Change Research Program by providing information to all interested parties.

CDIAC has produced over 40 numeric data packages on topics such as atmospheric concentrations of CO₂ and methane, industrial CO₂ emissions, long-term climate change, plant responses to elevated CO₂ levels, ocean chemistry, and soil nutrients.

In addition, CDIAC's information systems group produces a newsletter, *CDIAC Communications*, as well as the DOE Research Summary series and a glossary, *Carbon Dioxide and Climate*.

For more information, contact the Carbon Dioxide Information Analysis Cen-

ter, Oak Ridge National Laboratory, Oak Ridge, TN, 37831-6335. Telephone: 615/574-0390. Fax: 615/574-2232. ●

QUOTE OF THE MONTH

"Draconian and costly limits to greenhouse gas emissions (either by government fiat or taxes) based on seriously incomplete science...will cause needless misery in all countries that proceed on that course."

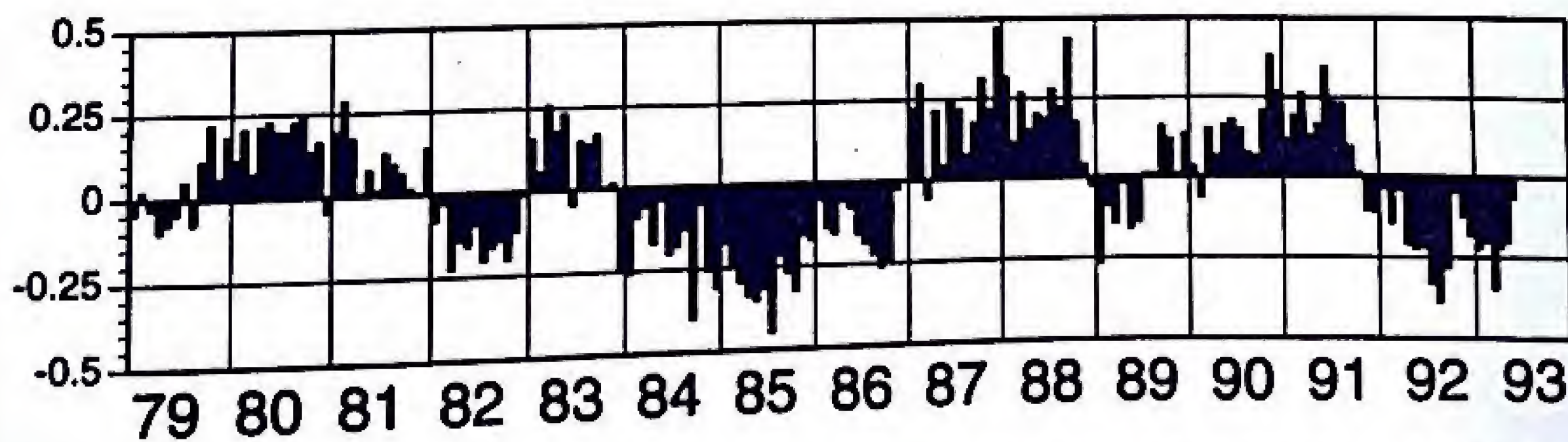
Dr. Sallie Balinas, deputy director, Mt. Wilson Observatory, Pasadena, California in *The Providence Journal* June 9, 1993

ATMOSPHERIC UPDATE

In last month's issue we introduced our readers to the important work of the Earth System Science Laboratory at the University of Alabama at Huntsville (UAH). Working closely with NASA's Earth Science Lab, Dr. John Christy analyzes global satellite temperature readings, the most complete data available. Dr. Christy's latest temperature update reports that temperatures in June were below average for the 20th

consecutive month, despite the record-setting heat in the eastern United States. While temperatures in the southern hemisphere were above the 10-year averages, the northern mid-latitudes were much below the decade-long June norms. Temperatures in the stratosphere continued to drop in June, approaching the coldest levels since the satellites were launched in 1979. ●

GLOBAL TEMPERATURE REPORT



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ARGONNE EXAMINES CLIMATE CHANGE

The Argonne National Laboratory Climate Change Program was initiated in June 1992 under the Associate Laboratory Director for Energy, Environmental and Biological Research. Headed by Ruth A. Reck, the program aims to gather information on all current environmental activities concerning global climate change, supplement knowledge on current undertakings and propose additional projects that Argonne can carry out under its charter to address major national environmental issues.

The Climate Change Program is conducting many studies for the Department of Energy's Atmospheric Radiation Program, including management of the Cloud and Radiation Testbed site in Oklahoma. Other projects include greenhouse gas sources/sinks research, tropospheric ozone studies, societal and environmental impact studies, and model and response strategy development (CO₂ sequestration, exotic fuels and more efficient internal combustion engines).

For more information, contact Gerry Stokes, scientific director for Argonne, at 509/375-3816. ●

CLIMATE FILE:

Useful Titles on Global Climate Change

UNDERSTANDING AGENDA 21

In *Agenda 21: The Earth Summit Strategy To Save Our Planet*, editor and environmental lawyer Daniel Sitarz simplifies the legal and technical jargon of the original 900-page tome covering the Earth Summit's central agreement. The book first presents chapters on achieving sustainable economic growth and improving human health, energy effi-

ciency, and waste and toxic chemical management. The author then concisely outlines the roles of individuals, from farmers to children, as well as the function of industry in achieving these goals. Finally, the book examines how to finance the measures and how to bridge the data gap.

The book is available for \$24.95 from EarthPress, 4882 Kellogg Circle, Boulder, CO, 80303, or by calling 800/462-6420. ●

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